

**REMARKS**

**Status of the Claims**

In the present Office Action, claim 1 was objected as having an informality, to wit, that the term “souter” should have been “outer”.

In the present Office Action, claim 1 was rejected under 35 U.S.C. §112 as being indefinite, in that in line 3 of the claim the term “said portions” could refer to different elements.

In the present Office Action, claims 1-3, 7-10, 12-19, 23-24, 26, 29, 51-52, and 56-57, were rejected under 35 U.S.C. § 103(a) as being obvious over Jurus ‘609 in view of Evans.

In the present Office Action, claims 5-6, 21-22, 30-37, 40-41, 45-46, 55, and 58 were rejected under 35 U.S.C. § 103(a) as being obvious over Jurus ‘609 in view of Evans and further in view of Ashley, Jr., et al. (hereafter Ashley).

In the present Office Action, claims 11 and 25 were rejected under 35 U.S.C. §103(a) as being obvious over Jurus ‘609 in view of Evans and further in view of Beyer.

In the present Office Action, claims 38 and 39 were rejected under 35 U.S.C. §103(a) as being obvious over Jurus ‘609 in view of Evans and Ashley, and further in view of Beyer.

## **Argument**

### **I. The Present Application**

As originally filed, the present application, titled Wheels of Single Component Construction and Method of Making, which is directed towards a method of manufacturing a unitary steel wheel having a 5° taper bead seat, equipment required therefore, and the resultant improved wheel, included 58 claims. Claims 1-3, 5-19, 21-26, 29-41, 45-46, 51-52, and 55-58 are presently pending in the application. In the present Response, twelve (12) dependent claims are herein cancelled. Accordingly, the application as currently presented comprises five (5) independent claims, and twenty-eight (28) claims depending from those independent claims. Thirteen (13) dependant claims were previously cancelled.

### **II. Informalities**

The Examiner objected to claim 1 as containing a typographic error, i.e., that the word “outer” was miss-spelled as “souter.” An appropriate correction has been entered.

### **III. Rejections under 35 U.S.C. § 112**

The Examiner rejected claim 1 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention, due to the fact that it was purportedly unclear which elements of the invention were being referred to by the phrase “said portions” in line 3 of the claim. Applicant has herein amended claim 1 to further identify the phrase “said portions” in line 3 to be “said inner and outer bead-seat portions.”

### **IV. Rejections Under 35 U.S.C. §103(a)**

In the present Office Action, the Examiner asserted that the previously submitted argument that Jurus (‘609) “suffers from greater fatigue concerns as a result of the unbalanced loading and greater deflection resultant” was unpersuasive since no evidence in the form of a declaration was submitted in support of the statement. By joining the center disk portion to the rim outside of the cylinder formed by the outer rim, the opposite edge of the outer rim is obviously at a greater distance from junction than if the junction was located between the inner

and outer edges, and accordingly the moment arm at the junction is greater when the center disk is joined to the outer rim outside of the cylinder formed by the outer rim, and thus for a given wheel size and loading, the bending moment at the junction is greater. While the Examiner has requested a declaration to this effect, Applicant submits that an understanding of the basic static forces (as well as the resultant dynamic forces when the wheel is in use) is well within the knowledge of a person of ordinary skill in the art, and accordingly no declaration should be required. If the Examiner maintains the objection, Applicant will supply a declaration attesting to this foundational fact of wheel design.

Contrary to the Examiner's position, Jurus '609 does not show a wheel with the junction of the center disk portion being between the inner and outer edges of the rim portion. The rim portion is the section of the wheel onto which a tire is mounted. The tire engages the wheel at two locations: where the inner wall of the tire meets the rim, and where the outer wall of the tire meets the rim. Bead seats are formed at these locations, to retain the beads (the portions of the inner wall and outer wall of the tires designed to engage and seal the tire to the rim), and to allow a pressure tight seal to be formed with the bead.

The weight of a vehicle resting on the tires is transmitted from the ground to the rim through the sidewalls of the tires. The vertical component of this force is thus transmitted to the rim at the bead seats. This force must be resolved through the wheel to the portion of the center disk which is engaged to a vehicle axle. Thus, the geometry between the location of the bead seats and the junction with the center disk affects the structural loading conditions present within the rim. Thus, functionally, the bead seats form the inner and outer edges of the rim portion, as these are the loading points for the wheel.

Jurus '609, and in particular in Figures 2 and 6K-6L, does not disclose the junction between the center disk portion and rim portion occurring between the inner bead seat and the outer bead seat. In Figure 2, reference numerals 5 and 4 are indicated to be the inner and outer bead seats. The junction between the center disk portion 2 occurs adjacent reference number 44, and thus both bead seats are to the right of the junction, with respect to structural loading of the wheel. In Figures 6K and 6 L, the structure is the same, with the bead seats 4 and 5 both being located to one side of the junction (again, adjacent reference 44), in this case to the left of the junction, with respect to structural loading of the wheel.

Further, as amended herein, the presently claimed wheel includes a drop center portion having a taper of between about 5 degrees and 15 degrees. While previously claimed in a dependant claim, this limitation has been amended into the dependant claims. While the use of drop center portions is known in the industry, such usage has been limited to multi-piece wheels, or wheels formed from a soft metal, such as in Jurus. The present manufacturing process enables the manufacture of a wheel from steel having the claimed attributes. Accordingly, the independent claims of the present application have been amended to more clearly identify the structural relationship between the outer rim and the center disc portion.

Jurus, U.S. Pat. No. 5,740,609, is directed towards a unitary wheel, however locates both bead seats to one side of the junction between the center disc portion and the rim portion. This is highly significant, since all of the force of tire loading is resolved to one side of the junction, generating higher bending moments at that junction, and allowing greater deflection of the edge of the rim (opposite to the junction between the center disc portion and the outer rim portion) in towards the center of the wheel. Thus, Jurus '609 suffers from greater fatigue concerns as a result of the unbalanced loading and greater deflection resultant.

Jurus, U.S. Pat. No. 4,554,810, is directed towards a segment of a complete wheel. The segment includes part of the outer rim, as well as the center disk. Jurus does require, however, that a second segment complete the outer rim, and be formed separately, and thus does not disclose a unitary wheel, or a method for forming one. In particular, the structure of Jurus does not include both bead seats on a unitary piece.

Evans U.S. Pat. No. 4,185,370 likewise does not disclose a unitary wheel, but rather only a method for forming the outer rim portion, leaving the center disk as a separate assembly.

Ashley Jr., et. al., U.S. Pat. No. 4,962,587 also does not disclose a unitary wheel, but rather a rim portion which would then have to be joined to a center disk.

Beyer U.S. Pat. No. 4,528,734 does describe a unitary wheel, although the fabrication method is limited to the use of soft alloys, as a result of the reliance on forging to form the preform. The use of forging operations work hardens the material, as well as creates a second, significant limitation to the process of forming the wheel: as the preform is formed by forging, the center axis of the pre-form is not of necessity the same as the axis of the spin forming operation. Thus, not only can the resultant wheel have concentricity issues, spinning operations performed as a later part of the process may see large tool load variations resultant from the lack

on concentricity. Thus, the formation of the pre-form through a forging process creates significant limitations, as opposed to the wheel of the present invention.

Furthermore, Beyer suffers from the same limitations as that of Jurus '609: the junction between the center disc portion and the outer rim is outside of both bead seats (or inside of both bead seats, depending on your frame of reference). This results in unbalanced loading, with the resultant bending moment and deflection concerns.

**A.     Claims 1, 15, 30, 45, and 51 Are Not  
Obvious Over Jurus '609 in View of Evans**

Applicant has herein amended the independent claims to more clearly identify the structural arrangement between the center disc portion and the bead seats, as well as the presence of the deep well. Each of the independent claims expressly identify that the junction between the center disc portion and the outer rim is located between the bead seats. The bead seats form the boundary of the tire loading applied to the outer rim, primarily as a result of loads transferred through the sidewalls of tires mounted to the rims. As discussed above, Jurus '609 forms the junction outside of the bead seats, and thus suffers from an infirmity with regards to this loading. Evans does not discuss the center disc portion, nor the resultant issues with respect to the junction between the center disc portion and the outer rim. Accordingly, the addition of Evans to the disclosure of Jurus '609 does not disclose this limitation, and cannot render the independent claims obvious. Neither Jurus '609 nor Evans teach a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609 nor Evans teach a process for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609 nor Evans teach a machine for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Furthermore, as each of the remaining claims rejected as obvious over this combination include this limitation, none of the presently rejected claims can be obvious over the combination.

**B. Claims 1, 15, 30, 45, and 51 Are Not Obvious Over Jurus '609 in View of Evans and Ashley**

As noted above, Applicant has herein amended the independent claims to more clearly identify the structural arrangement between the center disc portion and the bead seats, as well as the presence of the deep well. Each of the independent claims expressly identify that the junction between the center disc portion and the outer rim is located between the bead seats. The bead seats form the boundary of the tire loading applied to the outer rim, primarily as a result of loads transferred through the sidewalls of tires mounted to the rims. As discussed above, the combination of Jurus '609 and Evans fails to teach this limitation.

Also as discussed above, Ashley is also directed towards an outer rim structure only, and thus does not teach or suggest the issues with respect to formation of a unitary wheel. Furthermore, Ashley is silent on the structural relation of the junction between the bead seats and the center disc portion, and thus the addition of Ashley to Jurus '609 and Evan does not disclose or suggest the present invention. Accordingly, the addition of Ashley to the disclosures of Jurus '609 and Evans still fails to disclose or suggest a critical element of the present invention, and cannot render the independent claims obvious. Neither Jurus '609, Evans, or Ashley teach a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609, Evans, or Ashley teach a process for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609, Evans, or Ashley teach a machine for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Furthermore, as each of the remaining claims rejected as obvious over this combination include this limitation, none of the presently rejected claims can be obvious over the combination.

**C. Claims 1, 15, 30, 45, and 51 Are Not Obvious Over Jurus '609 in View of Evans and Beyer**

As noted above, Applicant has herein amended the independent claims to more clearly identify the structural arrangement between the center disc portion and the bead seats, as well as the presence of the deep well. Each of the independent claims expressly identify that the

junction between the center disc portion and the outer rim is located between the bead seats. The bead seats form the boundary of the tire loading applied to the outer rim, primarily as a result of loads transferred through the sidewalls of tires mounted to the rims. As discussed above, the combination of Jurus '609 and Evans fails to teach this limitation.

Also as discussed above, Beyer has the same infirmity as Jurus '609, i.e., the junction between the center disc portion and the bead seats occurs outside of the bead seats, resulting in unbalanced loads generating high bending moments at the junction and greater deflection of the edge of the rim opposite to the junction. Accordingly, the addition of Beyer to the disclosures of Jurus '609 and Evans still fails to disclose or suggest a critical element of the present invention, and cannot render the independent claims obvious. Neither Jurus '609, Evans, or Beyer teach a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609, Evans, or Beyer teach a process for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609, Evans, or Beyer teach a machine for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Furthermore, as each of the remaining claims rejected as obvious over this combination include this limitation, none of the presently rejected claims can be obvious over the combination.

**D.     Claims 1, 15, 30, 45, and 51 Are Not Obvious  
Over Jurus '810 in View of Evans, Ashley and Beyer**

As noted above, Applicant has herein amended the independent claims to more clearly identify the structural arrangement between the center disc portion and the bead seats, as well as the presence of the deep well. Each of the independent claims expressly identify that the junction between the center disc portion and the outer rim is located between the bead seats. The bead seats form the boundary of the tire loading applied to the outer rim, primarily as a result of loads transferred through the sidewalls of tires mounted to the rims. As discussed above, the combinations of Jurus '609, Evans, Ashley, and Beyer fail to teach this limitation.

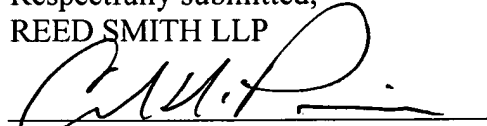
As discussed individually above, each of the references asserted by the Examiner fail to teach this limitation, and accordingly do not render obvious the claimed invention as embodied in the individual claims. Neither Jurus '609, Evans, Ashley, or Beyer teach a unitary wheel

having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609, Evans, Ashley, or Beyer teach a process for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Neither Jurus '609, Evans, Ashley, or Beyer teach a machine for forming a unitary wheel having the junction between the center disc portion and the outer rim formed between the inner and outer bead seats. Furthermore, as each of the remaining claims rejected as obvious over this combination include this limitation, none of the presently rejected claims can be obvious over the combination.

**V. Conclusion**

Based upon the above remarks, Applicant respectfully requests reconsideration and withdrawal of this restriction requirement and early allowance of the pending claims. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite prosecution of this application, the Examiner is urged to contact the undersigned attorney.

Respectfully submitted,  
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